

Chapter 2: Intro to Relational Model

Database System Concepts, 7th Ed.

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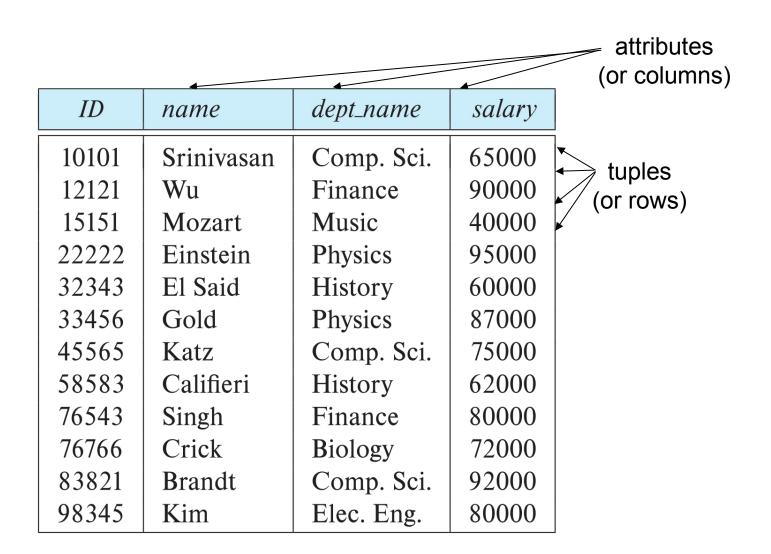


Outline

- Structure of Relational Databases
- Database Schema
- Keys
- Schema Diagrams
- Relational Query Languages
- The Relational Algebra



Example of a *Instructor* Relation





Relation Schema and Instance

- \blacksquare $A_1, A_2, ..., A_n$ are attributes
- \blacksquare $R = (A_1, A_2, ..., A_n)$ is a relation schema

Example:

instructor = (ID, name, dept_name, salary)

- A relation instance r defined over schema R is denoted by r(R).
- The current values a relation are specified by a table
- An element *t* of relation *r* is called a *tuple* and is represented by a *row* in a table



Attributes

- The set of allowed values for each attribute is called the domain of the attribute
- Attribute values are (normally) required to be **atomic**; that is, indivisible
- The special value *null* is a member of every domain. Indicated that the value is "unknown"
- The null value causes complications in the definition of many operations



Relations are Unordered

- Order of tuples is irrelevant (tuples may be stored in an arbitrary order)
- Example: *instructor* relation with unordered tuples

ID	пате	dept_name	salary
22222	Einstein	Physics	95000
12121	Wu	Finance	90000
32343	El Said	History	60000
45565	Katz	Comp. Sci.	75000
98345	Kim	Elec. Eng.	80000
76766	Crick	Biology	72000
10101	Srinivasan	Comp. Sci.	65000
58583	Califieri	History	62000
83821	Brandt	Comp. Sci.	92000
15151	Mozart	Music	40000
33456	Gold	Physics	87000
76543	Singh	Finance	80000



Database Schema

- Database schema -- is the logical structure of the database.
- Database instance -- is a snapshot of the data in the database at a given instant in time.
- Example:
 - schema: instructor (ID, name, dept_name, salary)
 - Instance:

ID	name	dept_name	salary
22222	Einstein	Physics	95000
12121	Wu	Finance	90000
32343	El Said	History	60000
45565	Katz	Comp. Sci.	75000
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Keys

- Let K ⊆ R
- K is a superkey of R if values for K are sufficient to identify a unique tuple of each possible relation r(R)
 - Example: {ID} and {ID,name} are both superkeys of instructor.
- Superkey *K* is a **candidate key** if *K* is minimal Example: {*ID*} is a candidate key for *Instructor*
- One of the candidate keys is selected to be the primary key.
 - Which one?
- Foreign key constraint: Value in one relation must appear in another
 - Referencing relation
 - Referenced relation
 - Example: dept_name in instructor is a foreign key from instructor referencing department



End of Chapter 2